STRATEGY RESEARCH PROJECT

VALUE OF WARRANTIES IN DEPARTMENT OF DEFENSE (DOD) ACQUISITIONS

BY

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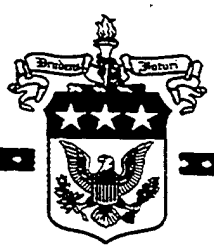

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Value of Warranties in Department of Defense (DOD) Acquisitions

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ABSTRACT

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TITLE: Value of Warranties in Department of Defense (DOD) Acquisitions

FORMAT: Strategy Research Project

DATE: 15 February 1997 PAGES: 36 CLASSIFICATION: Unclassified

Warranties have been a point of considerable discussion, if not controversy, within the Department of Defense (DOD) acquisition community for over a decade. Use of warranties within defense procurements is not new. What changed was the requirement placed upon DOD by Congress that mandates their use in weapon system procurement. The primary points of contention with defense use of warranties, besides their mandatory use, is whether they are cost effective and practical for use in acquisition of weapon systems. Numerous studies and reports have been published questioning the benefit of weapon system warranties. For the most part, these documents have recommended repeal of the law requiring warranties. The General Accounting Office published a recent report supporting repeal, while citing weapon systems warranties as impractical and not cost effective, which resulted in the government receiving a financial return of approximately 5 cents on the dollar. Mandating warranties for defense acquisition has not been a success. Although warranties in the commercial marketplace have been beneficial, they are impractical and not cost-effective for use in defense. It is time for Congress to repeal the warranty statute.

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Warranties have been a point of considerable discussion, if not controversy, within the Department of Defense (DOD) acquisition community for over a decade. Use of warranties within defense procurements is not new. What changed was the requirement placed upon DOD by Congress that mandates their use in weapon system procurement. The mandate from Congress was in response to public concern about performance shortfalls in weapon systems and overpricing of some highly publicized components. During this time period initial problems with the Abrams Tank and Bradley Fighting Vehicle surfaced and the cancellation of Divisional Air Defense (DIVAD) System occurred. There was also the highly publicized overpricing of toilet seats and coffee pots as components of aircraft and ships. The instrument of this change was two separate pieces of legislation in 1983 and 1984. The first was hastily put together and vague in interpretation, which resulted in the second, an updated guidance, issuance as the Defense Procurement Reform act of 1984, codified in Title 10 United States Code, Section 2403. This led to DOD guidance and implementing instructions from the four services issued from 1985 to 1988 in the form of regulations, orders, and instructions.

The primary points of contention with defense use of warranties were not only that they were now mandatory, but whether they were cost effective for government use and practical for use in acquisition of weapon systems. Warranty use within DOD differs considerably from commercial use. In the commercial environment a contractor manufactures an item and determines performance, durability, and reliability of the product. Then the product is offered to the public with a warranty containing provisions determined by the contractor. Since the product has already been manufactured and tested, the contractor has little risk that the product will not perform as designed. The cost of the warranty to the contractor for expected defects and tested

reliability are plugged back into the cost to the consumer. In the DOD environment the government determines or negotiates the warranty prior to the contractor manufacturing the product. The design of the product is controlled through government approved specifications and the contractor builds to these specifications, and not necessarily to performance characteristics. The potential cost risk of a warranty increases with limited control and a less mature product. If the contractor can satisfactorily substantiate the cost of the warranty during negotiations, the cost may be too high for the government. If the contractor is unable to adequately negotiate his potential warranty cost, the cost risk may be too high for the contractor.

The value of warranties in DOD has a solid goal of ensuring system performance and placing the burden of risk on the contractor for not providing the desired performance. This goal seems worthwhile and straightforward on the surface, however, with further study, the true value may be very limited. This research paper will evaluate the appropriateness for use of warranties in DOD, especially in light of recent acquisition streamlining. The paper will begin by setting the background with a brief explanation of the roles and history of warranties, followed by an analysis of the Congressional legislation effecting use of warranties in DOD. The next part of the paper will contain a comparison of commercial and DOD use of warranties with inherent advantages and disadvantages, leading into an analysis of warranty use within DOD and followed by a brief conclusion and recommendations.

Role of Warranties

To begin a discussion on the role of warranties, a definition of warranty would be appropriate. Warranty as defined by Webster's Collegiate Dictionary is: "a usually written guarantee of the integrity of a product and the maker's responsibility for the repair or replacement of defective parts." The Federal Acquisition Regulation (FAR) defines warranty as: "a promise or affirmation given by a contractor to the government regarding the nature, usefulness, or condition of supplies or performance of services furnished under the contract." A more comprehensive definition that corresponds more closely to warranties used in DOD weapon system procurements is: "A legally binding guarantee - usually explicit but in certain cases implicit - whereby a contractor, with or without an explicit payment, agrees to remedy defects in design, manufacture, workmanship, materials, or performance existing at a specific time or emerging over a specific period in a weapon system. It may, in addition, provide positive incentives to exceed target specifications in these characteristics, or penalties if specific targets are not achieved."[1] All three definitions contain a common meaning in that the contractor or maker of the product guarantees or promises aspects of his product. It is further stated or implied that the contractor will make restitution, if required.

Under common law the guarantee is in the form of an implied warranty as assurance that the product will pass trade standards and be fit for ordinary purposes. This is defined as merchantability.[2] Under DOD contracting this implied warranty is nullified by the use of the standard inspection clause within the contract. DOD retains merchantability or assurance that the product is fit for ordinary or particular purposes intended by explicit provisions or clauses. The

basis of this assurance is the government's right to inspect and accept products and the associated explicit clauses for protection. This is further defined in contracts by specific design specifications, materials, quality procedures, workmanship, and/or performance requirements to which the product must comply, validated through inspections and acceptance. By the acceptance of the product, the government acknowledges that the product conforms to contract requirements and retains ownership. This acceptance is conclusive except for latent defects, fraud on the part of the contractor, or other specific clauses such as a warranty clause. Latent defects are defects that exist at the time of acceptance, but hidden and not discoverable at time of inspection. The difficulty with latent defects is proving that they existed at the time of inspection.[3]

As the various definitions and uses both within and outside DOD imply, warranties provide a guarantee or assurance from the contractor on the performance of his product. Within DOD the role of warranties can be separated into three primary functions: assurance-validation, insurance, and incentivization.[4] The assurance-validation function provides a means for the government to assure that the product delivered meets contract specifications at time of acceptance. These specifications take the form of required workmanship standards, design, materials, quality, performance and/or other characteristics as specified in the contract. These specifications are considered minimum acceptable requirements and require the contractor to take the necessary actions to correct any deficiencies. This guarantees that the government receives that for which it contracted. Assurance-validation normally ends acceptance except for a reasonable time after acceptance for latent defects. The insurance function provides protection against monetary losses through noncontract performance. As with assurance-validation, DOD is protected at acceptance

from any cost incurred to bring the product up to standards necessary to pass acceptance and conform to contractual requirements. The most significant value of the insurance function is in the post-acceptance period when failure to meet specifications or performance requirements can result in extremely large monetary impacts to the contractor. This situation is controlled by limiting the duration and negotiated risk-sharing between the government and contractor. The incentivization function provides rewards for overachieving specifications or penalties for failing to meet specifications. Warranties as a matter of course provide incentive to the contractor, however the incentivization function here refers to motivating the contractor to exceed a specific requirement. This differs from the assurance function, which motivates the contractor to meet minimum contract requirements or remedy the situation at his cost with no rewards for exceeding requirements.

History of Warranties

The origin of the first uses of warranties in DOD is grounded in commercial practices. The most common types of commercial warranties are consumer product warranties and guarantees offered by manufacturers of such common items as automobiles and household appliances. These warranties provided an indication of the producers confidence in his product and assured the buyer that the product is fit for use, free of defects, and will function properly for a reasonable period of time. Commercial warranties generally fall into two categories, full and limited warranties. Under a full warranty, the producer is responsible for repair or replacement of product at no additional charge if it is found defective during a specific period after purchase. Under a limited warranty, partial coverage is provided. This partial coverage can take many

different forms, however some of the more common forms are warranty on parts but not labor, prorated replacement cost according to usage, or warranty of certain components but not the entire product.[5]

These types of warranties with various modifications necessary for government use were used independently by each Service on a limited basis until the early 1960s. The 1964 revision of the Armed Services Procurement Regulation (ASPR) provided initial warranty guidance for DOD. This revision was initiated by Secretary of Defense McNamara as an effort to unify warranty practices among the services.[6] ASPR section I-324 provided written guidelines for contracting officers to use in determining use of warranties on various procurements. The general interpretation of the section was that the use of long-term warranties should be the exception rather than the rule.[7]

Early use of warranties by DOD were primarily directed towards the assurance-validation function and associated latent defects. With the increase in weapon system costs and complexity, more attention was being directed towards the post-acceptance period. One of the first such warranties was put in place in 1967 on the Navy F-4 gyro, which was a failure-free warranty. The gyros were warranted for 1,500 hours or five years, whichever came first.[8] The potential benefit of Navy F-4 gyro warranty and a number of other post-acceptance warranties led to new direction from DOD. In 1973, the Assistant Secretary of Defense (Installations and Logistics) issued a memorandum to the services encouraging trial use of warranties.[9] This was followed in 1974 and 1975 by additional memorandums urging the trial use of reliability improvement warranties

(RIWs). These types of warranties generally require the contractor to provide depot repair for a fixed price and over a specified period of time. One of first uses of the RIW was in 1975, on the Air force ARN-118 TACAN, a short-range navigation system for aircraft. The warranty provided $12.5 million for repair of 8,500 units over a period of four years. Repairs were required when units did not achieve targeted mean time between failure (MTBF) hours and compensation was required from the contractor if repairs were not completed in a specified turn around time (TAT).[10] The use of various types RIWs expanded during the late 1970s and early 1980s.

By the early 1980s, the use of warranties in DOD weapon systems acquisitions was becoming common knowledge, however they were only selectively used. As more experience was gained with newer and more sophisticated variants, more issues between DOD and industry were being raised. These new variants required considerable effort on the part of the government program office as well as the contractor to develop and implement. As a result of this situation, a number of guides and models were developed to explain the basic features of various warranties and provide simplified evaluation of their general use and effectiveness. By 1983, Congress was entering the picture in response to rising concern about performance deficiencies in weapon systems and overpricing of highly publicized components. The solution was to mandate use of warranties in weapon system procurements.

Congressional Legislation

Prior to 1984, warranty use within DOD was the exception rather than the norm. Warranties were purchased only when their cost-effectiveness could be proven or where the government had no

choice because of standard commercial practices. The following statement contained in an Army Materiel Systems Analysis Activity Logistics Study clearly reflected the use of warranties:

> Finally, remember that it is Army policy that warranties will not be acquired under normal circumstances. A warranty will be sought if it cannot be equitably removed from a commercial item, or if it will provide definite benefit to the army; the decision to acquire a warranty will be made only if the decision maker is convinced absolutely that one of the aforementioned conditions prevail.[11]

The two primary factors leading to the Congressional legislation of warranties on DOD, other than the government's reluctance to use warranties, was public awareness and Congressional oversight. During the preceding two decades consumers were becoming educated on product quality and demanded, through their purchasing power, manufacturers to stand behind their products. The emphasis on quality in Japanese auto production and television shows like consumer advocate Ralph Nader's "Fight Back", which publicized consumer claims of poor quality products, put quality on the front stage. The results were widespread use of commercial warranties. This new consumer awareness led to the conclusion that warranties were needed in the defense industry. The media also played an important role in this conclusion by publicizing defense contractors production of defective air planes, gun systems and ships; as well as spare parts costing many times more than a believed to be commercial equivalent. The situation was further highlighted by the amount of resources being used to fund the Reagan defenses buildup. Congress was a natural to step in and take action, especially considering the composition of our government with a Republican administration and Democratic led Congress. With all the various committees in Congress and the amount of attention from the media, there was no shortage of oversight from Congress on the defense acquisition process. This oversight led to over 185

different pieces of legislation in 1984, which directly or indirectly affected the defense acquisition process.[12]

The first round fired by Congress at DOD concerning warranties was Public Law 98-212, Section 794 of Defense Appropriations Act of 1984, which was signed by the President on December 14, 1983.[13] Section 794 was a short, succinct law, which progressed warranties from the guarantee of workmanship and defect-free materials, common to commercial warranties, to now mandating these provisions and adding a guarantee of performance. The Public Law contained four short subsections. The first subsection provided the warranty conditions:

> a. that the system and each component thereof were designed and manufactured so as to conform to the Government's performance requirements as specifically delineated.
> b. that the system and each component thereof, at the time they are provided to the United States, are free from all defects (in materials and workmanship) which would cause the systems to fail to conform to the Government's performance requirements as specifically delineated.
> c. that, in the event of failure of the weapon system or a component to meet the conditions specified in clause a. and b.:
>
> the contractor will bear the cost of all work promptly to repair or replace such parts as necessary to achieve the required performance requirements; or
> if the contractor fails to repair or replace such parts promptly, as determined by the Secretary of Defense, the contractor will pay the costs incurred by the United States in procuring such parts from another source.[14]

The significance of these conditions was the inclusion of performance requirements. Until this point of time, warranties were limited, as commonly seen in the commercial environment, to guarantees against defects in materials and workmanship. This seemingly minor shift in terminology had a major impact on contractors by shifting performance risk from the government to the contractor. The risk could be extremely high for the contractor if the system was still under

development and yet to be fully tested. The second subsection of the Public Law exempted government furnished systems or components provided to the contractor from the provisions of the first subsection. The third subsection provided waiver conditions:

> The Secretary of Defense may waive the requirements of subsection 1. in the case of a weapon system if the Secretary:
>
> a. determines that the waiver is necessary in the interest of the national defense or would not be cost-effective; and
>
> b. notifies the Committees on Armed Services and Appropriations of the Senate and House of Representatives in writing of his intention to waive such requirements with respect to such weapon system and includes in the notice an explanation of the reasons for the waiver.[15]

The waiver requirements seem straightforward, however the notification process provides the real obstacle. With the numerous contracts, the normal levels of screening required before arriving at the four defense committees, and the need for a sound substantiated explanation to show good faith in carrying out Congress' intent, there is little likelihood that the use of waives will be a common occurrence. The final subsection of the Public Law excludes combat damage and places the effective date as the enactment date of the Act, which was signed by the president on December 14, 1983.

The leading advocate of weapon system warranties in Congress was Senator Mark Andrews, a Republican member of the Appropriations Committee. He continued to push the use of warranties on the basis that if consumers could get warranties on nearly everything they buy, then so should the DOD. An example of the language used by Senator Andrews on the Senate floor illustrates his belief and the environment:

> "the purpose of the warranty system ... is to unleash the genius of American Industry, to make sure that sloppy and faulty designs do not go into production at high cost to the tax payer

and even worse, jeopardize the lives of our fighting men ... these commercial warranties are included together by the manufacturer and passed on to the final purchaser. This is precisely the way ... it should work in military procurement."[16]

During late 1983, Congress and the DOD were contending with well over a hundred pieces of legislation dealing with the acquisition process and did not anticipate warranties becoming a serious issue, as a result warranties legislation was not given a great deal of attention.[17] This point was illustrated by the fact that the warranty legislation was passed as a Senate floor amendment to the appropriations act without hearings in either the Senate or House of Representatives.[18]

Upon realizing that Senator Andrews' warranty legislation was now law and extremely difficult to comply with, DOD immediately utilized the waiver provisions of the law and placed a 90-day blanket waiver on the requirements. This was followed up with a request to have the law repealed.[19] DOD took the repeal request to the Senate Armed Services Committee with industrial support, where a more sympathetic audience existed and away from the Senator Andrews' Senate Appropriations Committee. This started a barrage of rhetoric from both sides. At the 1985 Senate Budget Committee hearings, Senator Andrews told Secretary of Defense Caspar Weinberger:

Time after time in the past year, we have heard of Defense Department waste and inefficiency, as well as weapon systems which fail to work. Imagine my surprise when I saw ... in the budget sent to us ... a clause that would eliminate the requirement for written guarantees.[20]

This was later followed up in the Senate Armed Services Committee by the Chief of Naval Operations, Admiral James Watkins, backing the repeal with the following comments:

The requirements to obtain warranties for military hardware, while well meaning in concept, will not achieve the desired results of lower overall military acquisition and operating costs. Military hardware designed to meet and defeat the threat does not, and can not, come from the same mold as the average toaster or television set.[21]

Senator Andrews followed up his vocal concern for the requested repeal and blanket 90-day waiver by sending correspondence to DOD requesting an explanation. The Senator was sent a detailed reply from Mary Ann Gileece, Deputy Under Secretary of Defense for Acquisition Management. The reply pointed out the potential impacts of reduced spares competition, hurting small contractors, delays in attempting to insert the provisions, and inhibiting technology innovation.[22] These points as well as numerous other comments emphasized the difficulty of implementing the legislation and pointed to the idea that the desired results of lower costs would likely end up increasing costs. The early rhetoric reached its high point with a response from Senator Andrews in a hearing before the Senate panel:

Defense Department arguments that requiring the warranties would raise weapons costs were a smokescreen. The pentagon is refusing to go along with the first systemic reform in 30 years.[23]

DOD used the 90-day waiver period to prepared Defense Guidance for implementing the requirements of Section 794. On March 14, Deputy Defense Secretary William Taft issued a Defense Guidance Memorandum providing guidelines for implementing Section 794.[24] The memorandum was an attempt to expand on the intent of the legislated warranty requirements, while integrating its requirements into defense practices and existing regulations, as much as possible. It included specific definitions of many of the terms, identified when the provisions would apply, delineated the requirement for both a design and manufacture conformance warranty

as well as an independent defect-free materials and workmanship guarantee, and provided a model guarantee.[25] The Defense Guidance did not change the intent of Section 794; the primary problems and objections remained.

Throughout 1984, efforts were continued by both DOD and industry to have the law repealed. A number of industrial leaders opposed to the warranty law appeared before the Senate Armed Services Committee. Franz Ohlson, vice president and director of procurement and finance council for the Aerospace Industries Association had the following comments, which provide a general perspective from industry:

> Simply stated, we believe that Section 794 is unworkable, cost ineffective and unnecessary in view of existing warranty provisions. Section 794 is an attempt to apply commercial warranty practices to government procurement of weapons systems. While well intentioned, this effort fails to fully take into account the special circumstances and restrictions inherent in military production.[26]

The reaction to comments by Mr. Ohlson and many other DOD and industry witnesses before the committee began to sway the tide towards repeal or change to Section 794. Senator John Tower, chairman of the committee went on the record stating that he had problems with requiring performance guarantees. He made the follow comments:

> There seems to me to be a great problem if we suddenly demand that defense contractors who have not designed a particular system stand as insurers that government's design will work. There is an important difference between a workmanship warranty, which insures the government that a system is properly built and a performance guarantee, which deals with whether or not the particular design will achieve its goals. The committee ... will consider revisions to the law ... in the next few weeks.[27]

Congress and DOD reached a compromise during the FY85 budget hearings, which resulted in the establishment of new warranty provisions as part of the Defense Authorization Act. The new warranty provisions were enacted in Section 2403 of Title 10 US Code and referred to as Public Law 98-525. Section 2403 answered many of the concerns of DOD with Section 794, however, the major issue of requiring both a defect-free materials and workmanship guarantee and warranty of performance requirements remained, although somewhat weakened and not necessarily applicable to all types of defense contracts.

A major direction by DOD was to gain more flexibility under the redrafted legislation. If a repeal was not possible, then a less restrictive law would be a good compromise. During testimony before the Senate Armed Services Committee, Lieutenant General James Stansberry of Air Force Systems Command made the following comments, which emphasized the point for needed flexibility in the law:

> Section 794 lacks the flexibility to recognize the very real need to be able to tailor our approach to warranties as part of the overall acquisition strategy for a program. We need the latitude to make informed judgments about whether a warranty is appropriate; what type of agreement is best suited to operational needs, and the warranty should be applied at the system, subsystem or component level, or at some combination of levels.[28]

The initial draft compromise legislation was worked out by Senator Andrews and two members of a special procurement task force of the Senate Armed Services Committee, Senator Dan Quayle and Senator Carl Levin.[29] Senator Quayle was the task force chairman and Senator Levin was a leading proponent of warranty legislation. The draft legislation was to be reviewed by the full task force and presented to Committee for inclusion in the FY85 Defense Authorizations Bill.

Section 2403, the resulting compromise legislation, contained eight subsections providing much more detail than Section 794. The new law included four primary changes. First, mandated warranties were restricted to mature full-scale production weapon systems, defined as systems having one tenth of the planned production completed, costing more than $100,000 or with total procurement cost over $10 million. Second, guaranteed performance requirements were defined as essential performance requirements and included maintenance and reliability characteristic. Third, mandatory warranties were limited to prime contractors. Fourth, the waiver requirement was slightly eased, restricting "do not proceed until approved by Congress waivers" to major defense acquisition programs and all other to be reported to Congress annually no later than 1 February. As a final general provision, Section 2403 did not prohibit the use of guarantees to a greater extent than required or that exceeded the included clauses.[30]

The provisions of Section 2403 are in effect today as originally authored with the exception of minor amendments. The only amendment other than administrative adjustments was enacted in 1994 through the Federal Acquisition Streamlining Act of 1994. This Act was built upon the recommendations of the popular Section 800 Panel brought into existence by Congress as part of the National Defense Authorization Act of 1991. As part of the Section 800 Panel an advisory panel was established to codify and simplify acquisition law.[31] The Acquisition Law Advisory Panel issued their report in January, 1993, which recommended that Section 2403 be repealed and that clear, specific guidance should be included in the regulations governing the purchase of warranties and issuance of waivers.[32] Considering the Panel recommendations and as part of the

Federal Acquisition Streamlining Act of 1994, the Senate required DOD to establish guidelines and procedures for negotiating and administering warranties and to take steps to test innovative approaches that work to develop more effective implementation as suggested by the Section 800 Panel. However, the recommendation to repeal Section 2403 was rejected.[33] Congress did amend Section 2403 by deleting the requirement for annual reporting to Congress on waivers granted during the previous year.[34] The legislation did not change the waiver approval level, which is held at the Service Assistant Secretary level.

Commercial Versus DOD Warranties

The emphasize behind mandated warranties on DOD was to gain the same benefits for DOD as the consumer was receiving through the growing and popular use of commercial warranties. With the heavy media coverage of defective weapon systems and excessive costs, the natural solution was the use of commercial warranties for DOD weapon systems. The result was seen through the actions of Congress by mandating warranties. However, commercial warranties are not directly applicable for DOD use and many of the benefits are not gained. The following section will contain discussion and comparisons of the differences.

The first place to start with a comparison of warranties is to look at the primary functions of warranties as previously discussed. Those functions are assurance-validation, insurance, and incentivization. Within DOD, the assurance-validation function provides a means for the government to assure that the product delivered meets contract specifications at time of acceptance. In the commercial marketplace the assurance-validation function tells the buyer that

the manufacturer stands behind his product and provides an indication of better quality. The commercial warranty is the only documented means for the consumer to compare quality among available products. For the manufacturer, who has built and tested the product, the commercial warranty is an instrument for him to advertise the product's quality. For DOD weapon systems, the situation differs considerably. DOD contracts with a company to build a system rather than selecting a product that is currently available in the market. Since the weapon system is not yet built, DOD places quality assurance provisions into its contract to inspect and test the product for conformance to specifications. DOD also has the advantage of working with the selected contractor early in the design and development process to specify the specific characteristic of the system and conduct reviews throughout the entire process. Considering the major differences in the approach to ensuring quality between the commercial and DOD environment, the assurance-validation function as related to commercial warranties may not be necessary in DOD warranties.

The insurance function is the prominate function in commercial warranties and possibly the least understood when used in the warranty of DOD weapon systems. In the commercial marketplace, the insurance function equates to an insurance policy for the buyer against repair or replacement costs over a specified period of time. As such the buyer is protected against contingent liability from losses due to workmanship, material defects, or design flaws as limited by the common law provisions of merchantability. The insurance function as used within DOD weapon systems is similar in that it provides protection against monetary losses through noncontract performance. As with assurance-validation, DOD is protected at acceptance from any cost incurred to bring the product up to standards necessary to pass acceptance and to conform to contractual

requirements. The most significant value of the insurance function is in the post-acceptance period when failure to meet specifications or performance requirements can result in extremely large monetary impacts to the contractor. This is where the insurance function begins to differ in DOD use verses the commercial marketplace.

The use of risk sharing is the underlining concept of insurance. In the commercial marketplace, the cost of the insurance is spread across all the consumers who buy the product and as such, the price is individually small to each consumer. This concept may be more commonly seen in the auto insurance industry. The auto insurance company charges annual premiums, which are small for each consumer compared to the costs the individually would have to bear, if involved in a serious accident. The insurance company in return pools the premiums to provide coverage of the costs associated with the hopefully few serious accidents and make a profit. As such the policy holders are sharing the risk of a serious accident by providing relatively small annual premiums. This risk sharing concept breaks down when used in procurement of weapon systems, since DOD is usually the only buyer. In this situation the contractor cannot spread the costs of insurance across multiple buyers. As a result the contractor must either bear the entire cost and include it in the price of the weapon system or pass the cost directly to DOD as the price of the warranty. Since the contractor is not in business to lose money, DOD bears the cost in either situation.

Two other factors influence risk sharing, knowledge of the product and the degree of risk aversion. Referring back to the example of the auto insurance company, it reduces the risk and remains competitive by having better knowledge of the policy holder and thus increases premiums

for those more prone to have an accident and reduces premiums for policy holders with excellent driving records. A good example in the manufacturing side of industry would be televisions. Here the manufacturer has tested and produced thousands of televisions and has proven knowledge of repair and replacement cost. This knowledge in the commercial marketplace allows the equitable sharing of insurance costs to the consumer without significant financial risk to the manufacturer. In contrast, the lack of product knowledge is the prevalent situation in procurement of weapon systems and as a result, creates a much higher degree of risk aversion in defense contractors. Weapon systems tend to involve advanced technologies and state-of-the-art-designs and warranties are required from defense contractors prior to full knowledge of product performance, which both significantly increase the contractors financial risk. This in turn is reflected in the warranty cost to DOD. The defense contractors estimated cost in a risk averse environment would tend to be much higher than the equitable premiums found in the commercial marketplace and would only seen worthwhile in those few instances when the contractor underestimated the financial risk. However, DOD has a large number of weapon systems and, as in the auto insurance industry with the risk of a serious accident and a large number of policy holders, the shared risk could be spread across all weapon systems. This is the reason the government has chosen to self-insure against loss in most other areas. Also, historically in cases where defense contractors have incurred large losses, DOD has tended to take action to provide relief under the provisions Public Law 85-804 (Extraordinary Contractual Relief) and prevent the contractor from going out of business.[35]

The last of the three functions, incentivization, generally motivates the contractor to maintain or improve product quality. The motivation is not having to perform warranty services and thus improve profit. In the commercial marketplace, incentivization is not a significant factor in warranties. Commercial manufacturers have mature knowledge of their products and a competitive environment leading to equitable pricing of warranties. The more significant factor in maintaining or improving product quality is to increase sales and thus improve profit. Within DOD, the incentivization function provides rewards for overachieving specifications or penalties for failing to meet specifications. Warranties as a matter of course provide incentive to the contractor, however the incentivization function here refers to motivating the contractor to exceed a specific requirement. This differs from the assurance function, which motivates the contractor to meet minimum contract requirements or remedy the situation at his cost with no rewards for exceeding requirements. The difficulty in incentivizing defense contractors lies in limited competition in an averse risk environment. With limited competition, as a result of unique advanced technologies and relatively few matched competitors, defense contractors are less inclined to limit their ability to fully cover their estimated cost of risk being warranted. Furthermore, the use of warranty funds by the contractor to improve quality in a risk averse environment generally requires the contractor to assume greater risk.

One last area of comparison between commercial and DOD warranties, that deserves discussion, is not in the function of warranties, but their administration. In the commercial marketplace the administration requirements are simple with few conditions. The buyer returns the product with proof of purchase to the manufacturer or place of purchase and receives the benefits of the

warranty. The benefits are provided directly to buyer in the form of a refund, exchange, or repair. In DOD the situation is considerably different. The user in the field submits a warranty claim, which is processed through layers of administration to eventually arrive at the contractor with the defective product. The claim is pursued by DOD with the contractor, who either rejects the claim as not conforming to the provisions of the warranty, repairs or replaces the defective product, or provides reimbursement. If the product is repaired or replaced, it is normally placed in a supply depot for future requirements. If the contractor provides reimbursement, the existing contract price is adjusted or the funds are provided to the U.S. Treasury. In any of the cases the user in the field does not receive any direct benefit.

Warranty Use within DOD

Warranties have been difficult to apply to defense procurement. The track record is filled with reports, investigations, and studies that document the difficulties. The considerable difference between commercial and DOD warranties and the attempted transfer of such a beneficial commercial tool to the defense industry, may have been like forcing a square peg in a round hole. The following section will provide a brief look at a number of reports by various agencies to build an understanding of warranty utilization in DOD.

The first report to review was prepared by the General Accounting Office (GAO) from field work conducted in 1987-88 and published in 1989. Since DOD was now spending hundreds of millions of dollars on warranties each year, GAO was to determine whether the services had effective warranty administration systems and were performing cost-effectiveness analyses.[36] The findings

were negative on both counts. This was not the first report from GAO on warranties. However, the first report concluded that DOD was generally complying with warranty laws. This second report involved a review of 48 major weapon system contracts involving all three services. DOD regulatory guidance prescribes that the services obtain warranties and comply with warranty legislation as well as establish procedures to track and accumulate data on warranty costs. Within the services, guidance for administering warranties and tracking associated costs were either non-existent, vague, or difficult to implement. The following comment concerning the Navy provides some insight into possible problems:

> The Navy's slow progress (in developing a system for administering warranties) is attributable to a lack of priority given to warranty administration within the Navy and uncertainty on how to establish an effective system. Specifically, detailed directives have been delayed because, among other things, the Office of the Chief of Naval Operations is concerned that the costs to establish the system may outweigh the benefits.[37]

Reversing the comment might shed some light on the root of the problem. The magnitude of developing an effective warranty administration system that tracks data and all associated costs from the field to the contractor will likely cost more money than it's worth and as such the Navy is not anxious to start wasting money. An effective adminstrative system would require addtional manpower, organization and oversight up and down the flow between the field, support organizations and contractors. A comment on the Air Force surfaces another possible problem concerning waiver submission:

> On two weapon systems reviewed, drawn out negotiations on warranties had continued without petitions for waivers. For example, two cost-effectiveness analyses of proposed F-16 Air Defense Retrofit Kits concluded that the warranties would not be cost-effective. In another case, two cost-effectiveness analyses on proposed warranties for fiscal years 1986 and 1987 procurements of the F-16 AN/APQ-68 Fire Control Radar concluded that the warranties would

not be cost-effective at the proposed prices. After 2 years of negotiation, a warranty price had not been negotiated and deliveries had started.[38]

The delay, although not justified, may have been rooted in the difficulties and time consuming effort of preparing a waiver that could successfully withstand the multiple levels of review required through the bureaucracy on the way to the Congressional Committees. Findings on the Army systems illustrates another problem in warranty administration. Cost and claim information on warranties showed in almost all cases, where they were purchased, that warranty costs exceeded warranty claims. Of the six systems reviewed over $23 millions was spent on the purchase of warranties with less than $40 thousand returned through claim reimbursements.[39] Although the final cost-effectiveness assessment was not completed by the Army at the time, these early figures indicate a definite problem. The following comments provided in the report by the Army focus attention to the magnitude of an effective warranty administration system:

> According to a TACOM warranty administration official, the low dollar value of claims is attributed to the user's failure to file paperwork and provide accurate claim information. Because of the worldwide dispersement of TACOM vehicles and the number of Army organizations and people involved in warranty administration, this official expressed doubts that the Army's system could adequately capture claims to make the warranties pay off.[40]

Although the GAO criticized DOD for not having effective warranty administration systems in place, which is a valid criticism, the report also provided a possible root reason for the problem, the sheer magnitude of the system and its limited benefit.

The second report of interest is the Streamlining Defense Acquisition Laws report prepared by the Acquisition Law Advisory Panel. It was discussed briefly in a previous section, however deserves

further review from a broader perspective. The report was prepared at the request of Congress to codify and simplify acquisition law. The Acquisition Law Advisory Panel issued their report in January, 1993, and recommended that Section 2403 be repealed and that clear, specific guidance should be included in the regulations governing the purchase of warranties and issuance of waivers.[41] The report uses two studies published in 1992, as support for its recommendations. The first study was conducted by the Defense Systems Management College (DSMC) and presented several observations. The first observation rejects the position of commonality between commercial and defense considerations for warranties by presenting a root difference:

> This is a faulty position, because most consumers believe that a product under warranty will not fail during the warranty period, and most consumer warranties are based upon competitive market considerations. On the other hand, a weapon system warranty is dictated by the customer, the Government, and envisions the ultimate failure of the product.[42]

Another finding and recommendation highlights the difficulties of warranty administration and waiver submission with an interesting recommendation to reverse the waiver process:

> The study found that the current guidance available to program managers does not succinctly and specifically enumerate real-world problems which program managers must overcome to successfully structure, implement, and administer warranties. Moreover, warranty programs rely on effective administration and, at the time of the statute, Congress did not provide funding for administration. It also stated that waiver requests are not seriously considered as proposed warranty options by procurement activities. To date, the use of waivers, which should have been extensive, has been virtually nil. ... the majority of the sources used in this study argued that the best solution to the warranty problem would be to repeal the statute. If this recommendation is not feasible ... Instead of trying to justify the use of a waiver, they recommended instead that the Government should have to justify the use of the warranty.[43]

The second study was conducted by the Under Secretary of Defense for Acquisition (USDA) with an emphasis to review warranty administration in the services. Each of the services provided

several weapon system case studies for review. The resulting analyses showed that in 4 out of 5 cases, contractor expenses for warranty repairs were less than the negotiated price of the warranties and significant numbers of claims were determined to be open or non-valid. The study noted a clear indication that warranty benefits were not being fully realized and recommended repeal of the statute.[44]

The final report was prepared by GAO and is the most current. It was published in June 1996 with the objectives to determine whether weapon system warranties provided the expected benefits and to assess whether the use of warranties, as required by law, is compatible with the acquisition of weapon systems. The review was conducted from November 1994 through February 1996 and included visits to six procurement commands, analyses of 22 ongoing acquisition programs, and review of numerous studies and reports.[45] Concerning the question of expected benefits, the report contained the following comments:

> DOD is obtaining weapon system warranties that are not cost-effective ... We found that the government paid $94 million and collected $5 million on these weapon system warranties. We also calculated that the military services spend approximately $271 million annually to pay for warranties. Further, this cost is only the warranty price paid to the contractor. It does not include the additional costs to the government of negotiating and administering warranties.[46]

One of the primary reasons stated in the report for extremely low benefit returned from warranty costs is low claim submission, not unexpected considering the findings of previous reports. The following comments from the Air Force expands on a previously discussed characteristic that differentiates defense warranties from commercial warranties, in that the user does not receive any direct benefit:

One cause for the quantified cost exceeding quantified benefits is the low claims submission rate for warranted items. Air Force officials told us that one reason for the low claims rate is that submitting warranty reports and holding parts for warranty purposes is contrary to the primary mission of field units - to repair the equipment as soon as possible so that the equipment and the unit can resume its mission. A warranty functions contrary to the primary mission by requiring maintenance personnel to hold parts until a determination can be made as to whether the part is warranted and how it should be repaired. In addition, maintenance personnel sometimes replace broken parts on one system with good parts from one or more other systems to keep the maximum number of weapon system operating and available ... As a consequence, the broken or defective parts are moved from their original weapon system. This can void a warranty.[47]

Although these procedures may not be common to all of the services, the lack of any direct benefit to the user is common. Without any direct benefit the user is not motivated to spend the time with warranty administration, when that time could more effectively be applied to keeping weapon systems operating and available. In a study conducted by the Army Materiel Systems Analysis Activity (AMSAA) on engines, final drives and transmissions at the Army Tank Automotive Command, AMSAA concluded that only 537 of a potential 8,567 claims were actually submitted for 21 contracts with expired warranty periods.[48]

The GAO report also reviewed the waiver situation and found that since 1985 only 21 waivers had been requested DOD-wide, and 15 approved.[49] This does not include all the waiver requests not making it out of the services to DOD. The report cites three reasons why waivers are not believed to be a viable option: the high placement of the waiver approval authority, the potential negative attention focused on the program, and the administrative burden.[50] The report provides some interesting comments from several service officials interviewed as well as an case example:

Service officials at several major commands and at the assistant secretary level said that requests for waivers bring unwanted and often negative attention to the acquisition program. One service official stated that there is a definite stigma attached to waiver requests and another referred to it as a nightmare. Further, waiver requests impose a significant burden on the program

office, which has to generate all the necessary paperwork, including cost-benefit analyses, and brief them up the chain of command to the assistant secretary level, with little or no expectation that a waiver will be approved. An example, the F-16 program office sought a waiver for the essential performance warranty of the third F-16 multiyear contract in November 1991. The entire process, from the completion of the cost-benefit analyses and decision to seek a waiver to the rejection of the waiver request, took 11 months. This was the first attempt by this program office to obtain a waiver for the weapon system. The second attempt, on the 1994 procurement, was rejected after 8 months.[51]

The second stated objective of the report was to assess whether the use of warranties, as required by law, is compatible with the acquisition of weapon systems. GAO falls back on the primary functions of DOD warranties and uses the comparison with commercial warranties to assess compatibility in weapon system acquisition. The following extract from the report contains a summation of the argument and the recommendation:

> The government has traditionally self-insured because its larger resources make protection against catastrophic loss unnecessary. Further, it is often the only buyer for a product and cannot share the insurance cost with other buyers. As a result, a contractor cannot allocate the cost of insuring against the risk of failure among multiple buyers. DOD will bear the entire estimated cost. Also, DOD program officials told GAO that warranties do not motivate contractors to improve the quality of their products. As a result, requiring the use of warranties in weapon system acquisition is not practical and does not provide the government much in the way of benefits. GAO believes the warranty law should be repealed and the decision to obtain a warranty, in appropriate case, should be left to the program manager.[52]

Conclusion and Recommendations

Warranty use within DOD goes back to the early 1960 as another tool used by the program manager to potentially improve the acquisition process. Experiences gained with their use showed limited benefits, however in individual cases warranties could be a useful tool. General guidance as a result was to use warranties as an exception in weapon system acquisition, rather

than the rule. This all changed in 1984, when Congress attempted to help the acquisition process in DOD by mandating the use of warranties. The environment at the time encouraged action from Congress, considering the public concern about performance shortfalls in weapon systems and overpricing of some highly publicized components as well as the growing use of commercial warranties. The intentions of Congress were well meaning, however the tool for improvement, warranties, was not all that they had intended it to be.

Ever since warranties were mandated by Congress the practitioners of their use have doubted their benefit. The two primary concerns have been the practicality of their use and cost-effectiveness in weapon system acquisition. Both of these concerns are based on the general differences between commercial and defense warranties. In the commercial marketplace the manufacturer has already produced the product and as such has considerable knowledge of its performance. With this knowledge he is able to calculate an insurance cost to the buyer and include it in the product price with little risk. In this case the product warranty is more an advertising instrument than an insurance policy to the buyer. In DOD, this mature product knowledge does not normally exist and as a result, the risk averse contractor estimates a warranty cost that reflects the high risk, all of which DOD pays. This is a primary reason why the government has traditionally elected to self-insure. Another significant difference between commercial and defense warranties lies in the area of administration. In the commercial marketplace the administration requirements are simple with few conditions. The buyer returns the product directly to the manufacturer or place of purchase and the benefits are provided directly to buyer. In DOD, the user in the field submits a warranty claim, which is processed

through layers of administration to eventually arrive at the contractor with the defective product. The claim is pursued by DOD with the contractor and the user in the field does not receive any direct benefit. Without any direct benefit, the user is less inclined to spend the time and effort to submit warranty claims. Without claims, warranties simply provide no benefit and are thus not cost-effective.

Numerous studies and reports have been published questioning the benefit of warranties in weapon systems acquisition. For the most part, these documents have recommended repeal of the law requiring warranties. In 1993, the Acquisition Law Advisory Panel, which was under direction of Congress to review and simplify acquisition laws, published a report recommending repeal of the warranty statute. Congress rejected the panel's recommendation for repeal. In 1996, GAO published a thorough report again recommending repeal. In this report, GAO found that warranties used in the acquisition of weapon systems were neither practical nor cost effective, resulting in the government receiving a financial return of approximately 5 cents on the dollar. GAO has provided the report to the Senate and House Authorization Committees.

Mandating warranties for defense acquisition has not been a success. Although warranties in the commercial marketplace have been beneficial, they are impractical and not cost-effective for use in defense. Without mandated warranties, DOD would benefit from the elimination of an ineffective warranty administration organization and save the hundreds of millions of dollars spent annually to purchase them. It is time for Congress to take the advise of industry, defense, and the numerous agencies and repeal the warranty statute. The thirteen years spent under a requirement

for warranties has provided valuable experience on warranty utilization and will provide program managers a valuable tool when used selectively. However, the tool needs to remain at the discretion of the program manager and contracting officer.

Endnotes

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[5] Army Materiel Systems Analysis Activity, Evaluation of the U.S. Army Warranty Program (Washington: U.S. Army Materiel Systems Analysis Activity, 1992), 4-5.

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[9] Assistant Secretary of Defense (Installations and Logistics) Arthur Mendolia, "Trial Use of Warranties," memorandum for Secretaries of the Military Departments, Washington, 17 August 1973.

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[14] Defense Appropriation Act of 1984, United States Code Congressional and Administrative News, 98th Cong., 1st sess., 1983 (St. Paul: West Publishing Co., 1984), vol. 1, 1454-55.

[15] Ibid.

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[17] Mason, 29.

[18] Kuenne, 40.

[19] Flora Whitt, "Defense Dept. Proposing Warranty Mandate Repeal," Aviation Week & Space Technology, 20 February 1984, 44.

[20] Ibid.

[21] Ibid.

[22] Ibid.

[23] Flora Whitt, "Defense, Industry Officials Push Warranty Law Repeal," Aviation Week & Space Technology, 5 March 1984, 24.

[24] Eugene Kozicharow, "Pentagon Asks Change in Weapons Guarantees," Aviation Week & Space Technology, 2 April 1984, 14.

[25] Kuenne, 221-229.

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[33] Federal Acquisition Streamlining Act of 1994, United States Code Congressional and Administrative News, 103rd Cong., 2nd sess., 1994 (St. Paul: West Publishing Co., 1995), vol. 5, 2585-86.

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[38] Ibid., 20.

[39] Ibid., 26.

[40] Ibid., 27.

[41] Acquisition Law Advisory Panel, 2-117, 118.

[42] Ibid., 2-113.

[43] Ibid., 2-113,114.

[44] Ibid., 2-114,115.

[45] General Accounting Office, Weapons Acquisition: Warranty Law should Be Repealed, 15-16.

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[47] Ibid., 19.

[48] Army Materiel Systems Analysis Activity, 47-48.

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